tell you, that by pursuing the same method further, every, even the most minute, proportion and moulding of capital, frieze, triglyph, and cornice, may be drawn without a model so accurately, that it shall perfectly correspond in every respect with drawings made according to actual measurements of the building. Let us then represent one of these spaces by drawing on a large scale a rectangle three times as high as it is wide for the Doric order.

The topmost line represents the bottom of the cornice or weight of the roof to be supported, and the long sides represent upright beams of scaffolding. If we draw the diagonals of this rectangle (and call it X No. 1) we form, as it were, a joint stool for the ends of the weight to rest on. Through the centre of X draw a horizontal line to the sides of the rectangle: it divides the rectangle into two. Draw the diagonal of the upper half and call it X No. 2. It will be found to cut X No. 1 in two points, and these intersections invariably give the true diameter of the shaft in its upper third both in this and in all the orders. Now pursue the same course with X No. 2 as we did with the first X, by drawing a horizontal line through its centre: this cuts off one quarter from the whole rectangle: draw the diagonals of this uppermost quarter and call it X No. 3. Where X No. 3 cuts X No. 1 is invariably the line of the architrave. We have thus found two important proportions, viz., the lower part of the entablature, which in itself constitutes a weight in addition to the roof, and have also found a leading measurement of the shaft of the column. To show that the latter proportion is a true one relatively to the weight of the roof and the length of the column, bisect the uppermost line of the rectangle which we said represented the weight, and join its centre by two lines with the angles at the base or ground line. This represents a conical support for the middle part of the weight of the roof, and it will be observed that this passes exactly through the intersections of X No. 1 with X No. 2, showing that that part of the shaft concentrates, as it were, the principal lines of pressure and of support between the base line and the roof. Now divide the rectangle by letting fall a perpendicular from the apex of this triangle or cone upon the ground, through the centre of the column, and join the lower end of this perpendicular with the two ends of the line of the architrave drawn through the two intersections of X No. 1 with X No. 3: this will represent the bearing on the base of the lowest point of the entablature or weight pressing downwards and inwards, and where these lines cut the lower limbs of X No. 1 will be the diameter of a straight-sided column or pilaster of the order at that point: join these points with those found in the upper third of the shaft on each side, and produce them downwards to the base and upwards to the horizontal line (drawn through the middle of X No. 2), you will thus form the shaft of a column (without entasis) which will answer the minutest measurement of the actual column of the Parthenon; for, if perfectly correctly drawn, and the base be divided into sixty parts, you will obtain a measure by which to test every other proportion by authority—such as the height of the shaft, the diameter of the neck, and the distance between any two columns or intercolumniation (by doubling the distance between the base of the column and the side of the rectangle). If you now draw lines from the apex of the tall triangle to the ends of the line which divides the rectangle into two, you will find that they cut the upper limbs of X No. 3 in the exact line of the bottom of the frieze, and give the just width of the triglyph. In like manner every part of the order may be found till all is completed, and then, when compared with the model, the compasses will prove the accurate correspondence of some thirty or forty different proportions with the actual measurement of this splendid monument.* In examining this method, it is particularly deserving of attention, that every ornament introduced in the lines of pressure and support, such as the triglyph capital, &c. and every fillet of the cornice actually represent the contention of the opposing forces of gravity and support represented by intersections of these lines. The entasis, or bulging of the column, is esteemed such a point of dispute and difficulty, that I must shortly indicate how it is produced before I leave the Parthenon. For reasons connected with the science of optics, this was made chiefly conspicuous in the corner columns, which are seen against the light; whereas pilasters close upon a wall were made straight, and columns but little removed from one nearly so. To form the entasis, divide the lower half of the rectangle into three equal parts, or half squares, by horizontal lines, and join the ends of these lines with the opposite superior angle of the original rectangle. Now divide the upper third or square of the rectangle into four equal parts by horizontal lines. X No. 1 joins the top of the rectangle with the centre of the line which divides the rectangle into halves, or fourth half-square from the bottom. Now join the extremities of the next or second line from the top with the middle of the third line from the base; then those of the third line from the top with the second from the base; and, lastly, the third quarter (below the line of the architrave) with the middle of the base line: the intersections of these lines give a series of points which, when severally joined vertically, and produced, as before described, for the straight-sided column, will result in a beautiful parabolic curve or entasis, which falls on the same point of the base line as the pilaster.

Hitherto we have only considered one order of architecture, the Doric; but the same principles, slightly modified as respects the cornice, when a base is introduced for the column to rest on, will enable us to construct every other, and so perfect is the method, that we find the ornaments peculiar to each order grow out of the intersections of these and other lines, so that the allotted number of flutes in the shaft, the proportions of the capital and frieze, &c., and even their very forms and ornaments, become almost a necessity instead of being left entirely to the guidance of the taste of the architect.

The proportions of the columns and entablature, technically termed "the order," are, however, very subordinate to those of the building as a whole; and to want of consideration of the principles on which this is regulated in reference to the site it is designed to occupy, we owe most of the errors fallen into by modern architects, who have adopted Grecian models for our public buildings.

A tall narrow tower on the top of a hill makes but little appearance, its elevation being trivial compared with that on which it stands; so also a long low line of building on a plain is mean, considered architecturally. The Greeks well understood the effect of contrast. In proportion to the height and distance of the intended site they extended the width of the building, to give it dignity and importance; and the Parthenon on the top of the rock of the Acropolis, accordingly received two squares for its façade; but look to the unhappy effect of placing proportions designed for such a site on a level with the eye, as exhibited in the Manchester Exchange portico, far too heavy and massive for their situation. The inhabitants of the plains of Ionia, with no better sites for their temples than gently swelling knolls, felt this, and gave generally the proportion of a square and half to the façade, or rather two squares divided into five, omitting to fill up the two external spaces with columns: with this modification the height of the rectangle in which the column was formed was four instead of three times its width, and the proportions peculiar to the early or Athenian Ionic pillar were thence derived; and for columns in *antis* the still more perfect proportion of four and a half squares, the whole being well adapted to be viewed from a moderate distance. For a confined space in a city and on level ground, a still taller proportion was required for the elevation; and thence arose the Corinthian order of a square divided into six parts, or two squares, omitting two spaces or sixths at each end, giving rectangles of five times their width, in which to form their tall columns, subject, however, to modification. The warehouse of Messrs. Hargreaves, a handsome Corinthian edifice in Meal-street, Manchester, well shows how little these proportions suffer from being viewed in that narrow space; whereas the new Scotch Church in Grosvenor-square, in the same style, and beautiful near at hand, appears almost ugly from Oxford-road, and suffers greatly in comparison with an inferior but better placed building, the Charlton Townhall, of Doric proportions.

* To what extent is Dr. Bell acquainted with the investigations of Mr. W. P. Griffith in this path?—ED.

A PICTURE ON GLASS.

WE have recently seen a picture enamelled on glass, by Mr. Edward Baillie, from Mr. John Wood's "Shakspeare Reading one of his Plays before Queen Elizabeth and her Court," which is intended for the Great Exhibition. It is 6 feet by 5 feet. It exhibits a high degree of finish, and is painted in a style rarely attempted in this country, being, in truth, not "stained glass," but a *picture on glass*, with qualities peculiarly its own. It must have cost much time, anxiety, and trouble: the artist must have had strong faith and energy to enable him to carry it through on speculation. We hope his labour and skill will not pass unrewarded. On the left of the picture is Sir Walter Raleigh (statesman, seaman, soldier, chemist, and historian): the next is Lord Southampton; and then comes William Shakspeare. The Queen is the central figure, dressed in the gorgeous style for which she was well known. Lady Hunsden, Lady Nottingham, and Lady Southampton, make up the group.

The ruby glass in the different parts of the picture is of different manufactures: the curtain at the back of the Queen is Belgian, the dress of Sir Walter Raleigh is French, and the carpet and shoes of Shakspeare, &c. are English. The secret of making this colour was for a long time obscure, and every attempt to produce it was a failure. We may remark that in ancient recipes for making ruby glass, the metal "gold," precipitated by a solution of tin, is given as the colouring matter: modern science proves that ruby for window glass cannot be produced in this manner: a specimen, however, of the colour produced by gold is shown in the upper dress of Queen Elizabeth, which is coated on one side only: the colour where the hands, jewels, &c., occur is, previous to enamelling, removed by fluoric acid.

The term "enamelled," on glass, used in describing this picture, will perhaps be better understood by the following remarks. In ancient or mediæval figure painting, the effect of light and shade is produced simply by covering the surface of the glass with a coat of brown, after which the high lights are etched out, then the darker shades are painted in: such parts as are required to be yellow are stained on the back, also the flesh tints, and for this purpose once burning is generally sufficient.

Enamelling on glass includes, in addition to the above-mentioned process, the use of orange, red, blue, rose colour, &c., as required to produce the life-like effects of a portrait: these being highly vitrified on the glass become portions of it, similar to the enamelling on copper, with this difference, that the colours used for glass are of a transparent nature, whilst those used for copper are "body colours," being shown on a white ground. When we say that the heads and principal parts of this picture have been burnt five times, it will show the time, risk, and trouble entailed on the painter by this style of art.

This picture is composed of nearly eighty pieces of glass, which are fitted into a copper frame: the joinings are almost imperceptible, and, with the exception of Shakspeare's legs and feet, do not interfere with the effect of the whole.

ARCHÆOLOGICAL INSTITUTE.—On the 6th inst. the usual monthly meeting was held in Suffolk-street. Sir John Boileau presided. Many interesting objects were exhibited, and several papers read, including one on the *Bulla* (a Roman neck ornament), by Mr. Yates.